TORONTO

GENERAL METEOROLOGICAL REGISTER

FOR THE YEAR 1896.

REMARKS ON THE METEOROLOGICAL RESULTS AT TORONTO FOR THE YEAR 1896.

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TEMPERATURE.

The mean temperature of the year 1896 was 45°·36, being 1°·16 warmer than the average of 56 years and 1°·08 warmer than 1895.

The mean temperature of the several months was in eight instances above and in four below the average for their respective months, the average excess to the average defect being in the ratio of 2° to 2°·77. On each of the 293 days the mean temperature was above the normal of that particular day and below on 163 days. The mean temperature of each month, with the difference from the normal, was: January, 22°·18—0°·24; February, 22°·62+0°·13; March, 23°·57—5°·18; April, 45°·77+4°·80; May, 59°·79+7°·65; June, 64°·75+2°·36; July, 68·72+1°·10; August, 67°·49+1°·28; September, 57°·41—1°·22; October, 44°·77—1°·60; November, 39°·45+3°·35; December, 27°·84+1°·50. Dividing the year into the ordinary seasons we have for Winter, 22°·79; Spring, 56°·77; Summer, 64°·54; Autumn, 37°·35. The thermic anomalies differ from the normal temperature proper to the latitude: Winter, —13°·8; Spring, —0°·86; Summer, —1°·69; Autumn, —6°·98. On three months during the year the observed temperature exceeded the normal value for the latitude, viz.: May, 1°·69; June, 0°·15; July, 0°·02. The mean daily range for the year was 17°·58, the greatest monthly average occurring in August (22°·56) and the least in December (12°·45). The greatest daily range (38°·9) occurred on the 8th May, and the least (2°·8) on the 29th December. The warmest month relatively was May, estimated by its excess (7°·65) above the normal, July, the warmest absolutely. The coldest absolutely was January (22°·18). March was the coldest relatively, its mean being 5°·18 below the normal.

The climatic difference was 46° 54, the warmest day was the 12th of July, mean temperature, 78°·32, and the coldest the 16th of February, 5°·55 below zero; but the warmest day relatively was the 10th of May, it being 27°·80 above its proper normal, and the coldest the 16th of February, which was 29°·13 below the normal. The average temperature of the warmest and coldest days from former years was 77°·95 and 2°·24 below zero. The highest temperature of the year (91°·3) occurred on the 12th of July, and the lowest (17°·9 below zero) on the 17th of February. The annual range from these extremes was 109°·2, being 5°·2 less than 1895 and 6°·2 more than the average annual range. There were 39 instances on which the temperature at the hour of observation was 20° above the normal and 29 when a defect of equal amount occurred. The most striking deviations from the daily normal curve of temperature have been as follows:—

IN EXCESS.

			°				°
January	2,	Mean Deviation	13·23	May	11,	Mean Deviation	20·80
February	1,	do	13·02	do	16,	do	13·83
do	28,	do	12·15	June	7,	do	13·57
April	13,	do	12·97	October	29,	do	13·75
do	14,	do	16·17	do	30,	do	13·47
do	15,	do	15·57	November	16,	do	15·30
do	16,	do	22·85	do	17,	do	12·17
do	17,	do	22·62	do	26,	do	15·58
do	18,	do	17·78	do	27,	do	20·67
do	19,	do	13·42	December	12,	do	13·33
May	8,	do	16·42	do	29,	do	14·57
do	9,	do	25·97	do	30,	do	16·77
do	10,	do	27·80				

IN DEFECT.

			°				°
January	4,	Mean Deviation	13·18	March	11,	Mean Deviation	13 08
do	5,	do	24·83	do	12,	do	18·57
do	6,	do	15·10	do	13,	do	15·92
do	7,	do	14 63	do	14,	do	13·33
February	16,	do	29·13	do	20,	do	15·55
do	17,	do	28·80	do	22,	do	12 67
do	20,	do	18 67	do	23,	do	16·73
do	21,	do	16 57	April	3,	do	14·22
March	3,	do	13·55	December	23,	do	16·40
do	4,	do	15·58				

BAROMETRIC PRESSURE.

The mean height of the Barometer was 29·6382 inches, being 0·0185 inches more than the average. The month which showed the greatest deviation from the normal was February, 0·185 in excess; May and August showing the least 0·006, also in excess. Average deviation without reference to sign was small, being only 0·056. The highest reading was 30·422 inches at 4 p.m. of December 27th, and the lowest 28·734 at 4 p.m. of February 6th, giving a range of pressure of 1·688 inches.

The number of days of large abnormal variation in which the average pressure differed by two-tenths and upwards from the normal was 121, the greatest number (18) occurring in February, and least (3) in July and August.

HUMIDITY.

The mean humidity of the year was 75, being 2 per cent below the average, the greatest monthly humidity was 84, in January, and the least, 66, in May. There were 17 cases of complete saturation at the hour of observation; 5 in January, 3 in February, 1 in May, 1 in July, 2 in October, 4 in November, and 1 in December. The least humidity of the year at the hour of observation was 20 on the 14th of August, at 4 p.m..

CLOUDS.

The extent of the sky clouded was on the average of the year six-tenths of the whole. June was the clearest month and January the most cloudy. During the year there were 55 days completely clouded, being 11 less than the average (1875-79), the greatest number (21) occurring in January, none being registered in the months of April, May, July and August.

WIND.

The resultant direction of the wind was N. 88° W., showing 14 more northing than 1895, and 11° more southing than the ten years to 1890. The mean velocity of the wind without reference to direction was 8·44 miles. The most windy month was March, with an average of 10·00 miles per hour, and the least windy was August, with an average of 6·69 miles. The windiest day was February 19th, average velocity 38·53 miles per hour, and the day of least velocity September 18th, average velocity 1·02 per hour. The highest velocity in one hour was 50·0 miles, 4 to 5 p.m. of the 19th of September.

RAIN AND SNOW.

The total depth of rain that fell during the year was 21·770 inches, being 5·552 inches less than the average, and 0·761 less than the rainfall of 1895. The depth of snow, 73·3 inches, was 5 inches more than the average, and 18·5 inches more than the snowfall of 1895. September was the most rainy month as to quantity (5·085), and also with reference to the number of rainy days. December was the least rainy month, only 0·345 inches having fallen.

The day of greatest rainfall was the 23rd of January, when 1·845 inches fell. There was only one other day during the year on which over one inch fell.

The heaviest fall of snow in one day was 7·4 inches on the 19th of March. Rain fell on 104 days, being 10 less than the average number, and 3 more than 1895. Snow fell on 43 days, being 23 less than the average and 5 less than 1895. There were 174 days on which neither rain nor snow fell; in 1895 the number was 176. The rain occupied 426 hours, and the snow 335 hours in its fall, giving a total of 756 hours, or 31 days and 12 hours when rain or snow was actually falling.

THUNDER-STORMS.

Of the 25 thunder-storms occurring during the year, the first was on the 26th of March, and the latest on September 27th, 1 in March, 1 in April, 8 in May, 6 in June, 4 in July, 4 in August, 1 in September. The most severe storms were on the 25th of May, 7th of June, 6th of July, 5th of August, and 27th of September.

AURORA.

Auroral displays were more numerous than in the previous year. Of the 18 observed, none were of the first class, 2 of the second class, 1 of the third class and 15 of the fourth class. There were 172 nights favourable for observation. The most brilliant displays occurring on the 4th of March, 17th of May and 6th of August.

SUNSHINE.

The total duration of bright sunshine during the year was 2146·7 hours; number of hours the sun was above the horizon, 4474·4; ratio of registered to possible, 0·48.

GENERAL METEOROLOGICAL

MAGNETICAL OBSERVATORY,

Latitude 43° 39·4 N. Longitude, 5h. 17m. 34·65. Elevation

	Jan.	Feb.	Mar.	April.	May.	June.	July.
Average temperature	22°·18	22°·62	23°·57	45°·77	59°·79	64°·75	68°·72
Difference from average (56 years)	− 0·24	+ 0·13	− 5·18	+ 4·80	+ 7·65	+ 2·36	+ 1·10
Thermic anomaly (Lat. 43° 40′)	−10·62	−12·08	−16·53	− 4·43	+ 1·69	+ 0·15	+ 0·02
Highest temperature	37·7	48·9	54·9	79·7	90·8	86·3	91·3
Lowest temperature	−10·3	−17·9	4·6	18·3	36·5	41·9	47·2
Monthly and annual ranges	48·0	66·8	50·3	61·4	54·3	44·4	44·1
Average maximum temperature	28·21	29·96	31·25	55·60	71·11	75·90	80·01
Average minimum temperature	15·02	14·12	15·37	37·69	49·24	53·94	59·38
Average daily range	13·19	15·84	15·88	17·91	21·87	21·96	20·63
Greatest daily range	28·2	33·2	32·8	32·9	38·9	32·9	36·2
Average height of bar. at 32° Fah	29·7422	29·4642	29·6295	29·6922	29·5817	29·5823	29·6035
Difference from average	+ ·0942	− ·1852	+ ·0231	+ ·0948	+ ·0062	+ ·0109	+ ·0157
Highest barometer	30·176	30·256	30·220	30·225	29·977	29·869	29·936
Lowest barometer	29·191	28·734	29·023	29·298	29·085	29·158	29·241
Monthly and annual ranges	0·985	1·522	1·197	0·927	0·892	0·711	0·695
Average humidity of the air	84	83	76	74	66	67	72
Difference from average	+ 1	+ 2	− 2	+ 4	− 4	− 6	0
Average elasticity of aqueous vapour	0·108	0·111	0·103	0·249	0·336	0·414	0·505
Average temperature of dew point	20·0	20·6	19·0	40·1	48·1	53·7	59·3
Average of cloudiness	0·83	0·68	0·50	0·64	0·48	0·42	0·54
Difference from average	+ ·08	− ·01	− ·13	+ ·06	− ·09	− ·11	+ ·05
Resultant direction of wind	N 9° E	N 70° W	N 59° W	N 18° W	S 66° W	N 10° E	N 85° W
" velocity of the wind	0·94	2·39	3·89	0·52	0·84	0·48	0·25
Average velocity (miles per hour)	8·58	9·67	10·00	9·38	7·60	7·36	6·78
Total amount of rain in inches	1·855	0·990	1·345	0·730	2·440	1·105	2·175
Difference from average	+ 0·700	+ 0·106	− 0·098	− 1·445	− 0·612	− 1·774	− 0·792
Number of days of rain	3	4	6	12	12	6	11
Total amount of snow in inches	20·7	29·6	11·4	0·3	....	....	....
Difference from average	+ 3·3	+12·6	− 0·9	− 2·1	− 0·1	....	....
Number of days of snow	11	11	7	2	....	....	....
Number of fair days	9	10	14	11	19	17	17
Number of days completely clouded	21	8	5	0	0	1	0
Number of auroras observed	3	0	3	4	1	1	1
Possible to see aurora (No. of nights)	10	8	19	15	24	20	21
Number of thunderstorms	0	0	2	1	8	6	4
Number of fogs	0	0	2	1	2	1	4
Number of hours of bright sunshine	44·8	113·2	201·0	191·8	282·0	300·2	246·7
Number of hours of possible sunshine	285·7	302·5	369·9	406·5	461·1	465·7	470·9

REGISTER FOR THE YEAR 1896.

TORONTO, ONTARIO.

above Lake Ontario, 108 feet. Elevation above the Sea, 350 feet.

AUG.	SEPT.	OCT.	NOV.	DEC.	1896.	1895.	1894.	1893.	1892.	1891.	1890.
67°49	57°41	44°77	39°45	27°84	45°56	44°28	46°75	43°53	44°61	45°87	45°02
+ 1·28	− 1·22	− 1·60	+ 3·35	+ 1·50	+ 1·16	+ 0·08	+ 2·55	− 0·67	+ 0·41	+ 1·67	+ 0·82
− 1·01	− 4·09	− 9·03	− 3·75	− 8·16	− 5·66	− 6·74	− 4·27	− 7·49	− 6·41	− 5·15	− 6·00
89·9	86·3	66·8	63·8	48·9	91·3	93·4	90·7	93·3	93·5	91·9	89·4
42·3	27·6	28·7	17·1	1·1	−17·9	−21·2	− 9·9	−17·8	−10·2	− 2·0	− 2·7
47·6	58·7	38·1	46·3	47·8	109·2	114·6	100·6	111·1	103·7	93·9	92·1
79·16	66·46	52·41	47·16	33·75	....	....	....	....	....	....	....
56·59	48·04	37·44	31·91	21·29	....	....	....	....	....	....	....
22·56	18·42	14·97	15·25	12·45	17·58	17·26	16·27	17·15	15·58	16·45	16·22
31·9	28·9	27·8	29·0	26·7	38·9	36·9	24·3	36·3	38·6	37·8	36·0
29·6231	29·6242	29·6514	29·7078	29·7529	29·6382	29·6171	29·6246	29·5996	29·6325	29·6385	29·6313
+ ·0062	− ·0422	− ·0116	+ ·0843	+ ·1028	+ ·0185	− ·0025	+ ·0050	− ·0200	+ ·0129	+ ·0189	+ ·0117
30·001	29·963	30·142	30·228	30·422	30·422	30·240	30·516	30·467	30·356	30·266	30·334
29·274	29·052	29·196	28·992	29·127	28·734	28·746	29·035	28·227	28·846	28·536	28·762
0·727	0·911	0·946	1·236	1·295	1·688	1·494	1·481	2·240	1·510	1·730	1·572
70	79	75	78	80	75	75	76	77	77	75	78
− 4	+ 2	− 4	− 2	− 2	− 2	− 2	− 1	0	0	− 2	+ 1
0·481	0·381	0·230	0·202	0·130	0·254	0·253	0·277	0·262	0·272	0·257	0·272
57·9	51·5	38·1	34·8	24·2	38·9	41·3	42·9	41·5	42·5	42·0	42·5
0·47	0·55	0·63	0·76	0·71	0·60	0·57	0·60	0·59	0·61	0·59	0·62
− ·03	+ ·05	+ ·01	+ ·01	− ·05	− ·01	− ·04	− ·01	− ·02	·00	− ·02	− ·01
S 32° W	N 42° W	N 46° W	S 32° W	S 47° W	N 88° W	S 78° W	N 78° W	N 66° W	N 54° W	N 57° W	N 48° W
2·00	0·50	0·78	2·12	1·13	0·75	1·35	1·10	1·95	1·81	1·63	1·80
6·69	8·50	7·75	9·10	9·80	8·44	5·60	5·67	8·59	8·17	7·33	9·19
1·130	5·085	1·965	2·605	0·345	21·770	22·531	25·785	31·145	25·285	26·735	32·110
−1·741	+1·811	−0·393	−0·061	−1·253	−5·552	−4·791	− 1·537	+ 3·823	− 2·037	− 0·587	+4·788
9	15	11	11	4	104	101	114	105	119	108	119
....	....	1·9	3·4	6·0	73·3	54·8	37·8	85·7	42·2	47·8	52·6
....	....	+ 1·2	− 1·2	− 7·8	+ 5·0	−13·5	−30·5	+17·4	−26·1	−20·5	−15·7
....	....	2	3	7	43	48	32	64	43	50	52
17	14	20	10	16	174	196	179	156	165	193	159
0	3	3	5	9	55	48	43	50	57	60	68
2	1	1	0	1	18	11	23	18	33	18	7
21	16	15	12	13	194	195	199	208	195	212	186
7	2	0	0	0	25	23	36	41	40	19	21
0	5	9	1	2	30	33	30	31	36	38	13
272·2	180·2	143·2	94·1	77·3	2146·7	2150·7	2017·7	2052·4	2054·4	2065·1	1977·6
434·5	376·3	340·2	286·9	274·3	4474·4	4463·3	4463·3	4463·3	4474·4	4463·3	4463·3

TEMPERATURE.

	1896.	Average of 56 years.	Extremes.	
	°	°	°	°
Average temperature of the year	45·36	44·20	47·09 in 1878	40·77 in 1873
Warmest month	July	July	July, 1868	Aug., 1860
Average temperature of the warmest month	68·72	67·62	75·80	64·46
Coldest month	January	January	Feb., 1875	Feb., 1848
Average temperature of the coldest month	22·18	22·42	10·16	26·00
Difference between the temperature of the warmest and coldest month	46·54	45·20	.....	.....
Average of deviations of monthly means from their respective averages of 56 years, signs of deviations being disregarded	2·53	2·76	3·58	.....
Month of greatest deviation without regard to sign	May	January	Feb., 1875	.....
Corresponding magnitude of deviation	7·65	4·12	12·33	.....
Warmest day	12 July	.....	July 14, '68	July 31, '44
Average temperature of the warmest day	78·32	77·95	84·50	72·75
Coldest day	16 Feb.		Feb. 6, 1855 Jan. 22, '59	Dec.22,'42
Average temperature of the coldest day	−5·55	−2·24	−14·33	9·57
Date of the highest temperature	12 July		Aug. 24, '54	Aug. 19, '40
Highest temperature	91·3	90·87	99·2	82·4
Date of lowest temperature	17 Feb.		Jan. 10, '59	Jan. 2, 1842
Lowest temperature	−17·9	−12·12	−26·5	1·9
Range of the year	109·2	103·00	118·2	87·0

BAROMETER.

	1896.	Average of 55 years.	Extremes.	
Average pressure of the year	29·6382	29·6196	29·6779 in 1849	29·5602 in 1864
Month of the highest average pressure	Dec.	Sept.	Jan., 1849	June, 1864
Highest monthly average pressure	29·7529	29·6664	29·8046	29·6525
Month of the lowest average pressure	Feb.	June	March, 1859	Nov., 1859
Lowest monthly average pressure	29·4642	29·5714	29·4143	29·5886
Date of the highest pressure in the year	27 Dec		Jan. 8, 1866	Mar. 7, 1878
Highest pressure	30·422	30·357	30·940	30·139
Date of the lowest pressure in the year	6 Feb.		Jan. 2, 1877	June 2, 1894
Lowest pressure	28·734	28·699	28·166	29·035
Range for the year	1·688	1·658	2·240 in 1893	1·303 in 1845

RELATIVE HUMIDITY.

	1896.	Average of 55 years.	Extremes.	
Average humidity of the year	75	77	82 in 1851	73 in 1858
Month of greatest humidity	January	January	Jan., 1857	Dec., 1858
Greatest average monthly humidity	84	83	89	81
Month of least humidity	May	May	Feb., 1843	April, 1849
Least average monthly humidity	66	70	58	76

EXTENT OF SKY CLOUDED.

	1896.	Average of 43 years.	Extremes	
Average cloudiness of the year	0·57	0·61	0·66 in '69'77	0·57 in 1856
Most cloudy month	January.	Dec.	.....	.....
Greatest monthly average of cloudiness	0·80	0·76	0·89	0·73
Least cloudy month	June.	July.	.....	.....
Least monthly average of cloudiness	0·42	0·49	0·29	0·50

WIND.

	1896.	Average of 17 years.	Extremes.	
Resultant direction	N. 88° W.	N. 61° W.		
Resultant velocity in miles	0·75	2·51	.....	.....
Average velocity without regard to direction	8·44	9·64	.....	.....
Month of greatest average velocity	March.	March	10·54 in '80	8·32 in '78
Greatest monthly average velocity	10·0	11·49	April, '80	Dec. 1875
Month of least average velocity	August.	July	13·88	10·42
Least monthly average velocity	6·69	7·56	July '78	July, 1881
Day of greatest average velocity	Feb. 19		5·93	8·43
Greatest daily average velocity	38·53	28·98	Nov. 17 '70	Feb. 10, '85
Day of least average velocity	Sept. 18°		41·67	23·79
Least daily average velocity	1·92		.....	.....
Hour of greatest absolute velocity	Sept. 19 4 to 5 p.m.		..... April 20th, 8 to 9 a.m.	..... Jan. 17, '85 10 to 11 a.m.
Greatest velocity	50·0	45·67	60·0	39·0

NOTE.—During the year 1896, the wind has been obtained from the records of the anemograph at the observatory at a lesser elevation than formerly, and no comparison has been made with the result of former years. The extremes are from the Island anemograph

RAIN.

	1896.	Average of 56 years.	Extremes.	
Total depth of rain in inches	21·770	27·322	43·555 in '43	17·574 in '74
Number of days on which rain fell	104	114	145 in 1890	80 in 1841
Month on which the greatest depth of rain fell	Sept.	Sept.	Sept., 1843	June, 1887
Greatest depth of rain in one month	5·085	3·274	9·760	2·655
Month in which the days of rain were most frequent	Sept.	Oct.	Jan., '69 Oct., '90	May, 1841
Greatest number of rainy days in one month	15	13	23	11
Day on which the greatest amount of rain fell	Jan. 23		Sept. 14, '43	Sept. 14, '48
Greatest amount of rain in one day	1·845	1·905	3·455	1·000

SNOW.

	1896.	Average of 53 years.	Extremes.	
Total depth of snow in inches	73·3	68·3	122·9 in '70.	34·6 in '88.
Number of days on which snow fell	43	66	87 in 1859.	33 in '48.
Month in which the greatest depth of snow fell	Feb.	January.	March, '70.	Jan., 1895.
Greatest depth of snow in one month	29·6	17·4	62·4	10·5
Month in which the days of snow were most frequent	Jan. and Feb.	January.	Dec., 1872.	Feb., 1848.
Greatest number of days of snow in one month	11	15	24	8
Day in which the greatest amount of snow fell	19th Mar.	—	Feb. 5, '63. Mar. 27, '70.	4·6 Jan '88
Greatest fall of snow in one day	7·4	8·9	16·0	3·0

SUNSHINE.

	1896.	Average 1882 to 1895.
Total duration of bright sunshine in hours	2145·7	2168·0
Ratio to possible amount	0·48	0·45
Month of greatest relative amount	May	July.
Ratio to possible amount	0·64	0·61
Month of least relative amount	December	December.
Ratio to possible amount	0·16	0·19
Number of days completely clouded	55	67
Day of greatest relative amount	January 5	—
Ratio to possible amount	0·96	0·91

DIFFERENCES OF CERTAIN METEOROLOGICAL ELEMENTS FOR 1895 FROM THE NORMAL VALUES FOR EACH QUARTER AND YEAR.

	Bar.	Tem.	Rain.	Days Rain.	Snow.	Days Snow.	Clouded Sky.
	in.	°	in.				p. c.
Winter	— ·0226	— 1·76	+ 0·708	— 3·24	+ 15·0	— 9·35	— 0·02
Spring	+ ·0373	+ 4·94	— 3·831	— 4·43	— 2·2	— 2·07	— 0·04
Summer	— ·0068	+ 0·39	— 0·722	+ 1·24	—	—	+ 0·02
Autumn	+ ·0662	+ 1·68	— 1·707	— 3·72	— 7·8	—11·95	— 0·01
Year	+ ·0185	+ 1·16	— 5·552	—10·15	— 5·0	—23·39	— 0·01

PERIODICAL OR OCCASIONAL EVENTS, 1896.

January	16.	Large flock of Wild Geese flying S.W. Snow Buntings about.
	17.	Flocks of Grosbeaks.
	20.	Lowest water in Bay 26in. below 0; 23rd, 24th, great ice and rain storm.
	29.	Flocks of Grosbeaks again numerous
February	27.	Robins about.
March	11.	Song Sparrows. 17th, Spring birds numerous. 29th, Bronze Grackle, Moths numerous. First Thunder of year.
	30.	Robins numerous. Gray Birds, Wild Geese, Brown Butterfly.
April	3.	Juncos. 11th, Plover. 12th, Meadow Lark, Frogs piping, Blue Bird.
	6.	Large flocks of Ducks in Bay. 7th, Last measurable snow. 8th, Schooner arrived.
	13.	Phœbe bird, Golden Woodpeckers, Hawk, May beetle, Crocus in bloom.
	14.	Chipping Sparrow. Soft Maples in bloom. Lawn grass green.
	14.	Woodpeckers numerous. 15th, Cabbage Butterfly, Kingfisher. Elm in bloom.
	18.	Hepatica and Arbutus in bloom. 20th, Towhee numerous. 21st, Swallows.
	23.	Frost.
May	1.	Willow in leaf. 2nd, Orioles seen. Dandelion in bloom.
	4.	Cherry in bloom. 6th Humming Bird. Japonica in bloom. 7th, Plum in bloom. 8th, Apple in bloom. Elder in bloom. 10th, Lilac in bloom.
	12.	Horse Chesnut in bloom. 14th, Mountain Ash.
June	2.	Night Hawks. 18th, Cherries ripe.
August	27.	Large flocks of Robins and Blackbirds. ome Snowballs in bloom.
September	8.	Swallows appear to have left.
	20.	First frost and ice. 23rd, First entry below 32° of season.
	27.	Last Thunder Storm.
October	8.	First snow flakes. 17th, First measurable snow.
December	22.	Bay frozen. 25th, Sleighing.